

SEQUENCE LISTING

<110> Mahajan, Pramod B.

<120> Rice MLH1 Ortholog and Uses Thereof

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atg gac gag	cct tcg	ccg cgc	gga ggt	ggg tgc	gcc ggg gag	168
Met Asp Glu Pro	Ser Pro Arg	Gly Gly	Cys Ala	Gly Glu Pro		
1	5	10	15			

cgc atc cgg agg	ttt	gag tcg	gtg gtg	aac cgc atc	gcg gcg ggg	216
Arg Ile Arg Arg	Leu	Glu Ser Val	Val Asn Arg	Ile Ala	Gly Ala	
20	25	30				

gag gtg atc cag	cg	ccg tcg	tcg	gcg gtg	aag gag ctc atc	gag aac	264
Glu Val Ile Gln	Arg Pro Ser Ser	Ala Val Lys	Glu Leu Ile	Glu Asn			
35	40	45					

agc ctc gac	gct ggc	tcc agc	gtc tcc	gtt gcg	gtg aag gac	ggt	312
Ser Leu Asp	Ala Gly	Ala Ser	Ser Val	Ser Val	Ala Val	Lys Asp	
50	55	60					

ggc ctc aag ctc	atc cag	gtc tcc	gat gac	ggc cat	ggc atc	agg ttt	360
Gly Leu Lys	Leu Ile Gln	Val Ser Asp	Asp Gly	His Gly	Ile Arg	Phe	
65	70	75	80				

gag gat ttg	gca ata	ttg tgc	gaa agg	cat act	acc tca	aag tta	tct	408
Glu Asp Leu	Ala Ile	Leu Cys	Glu Arg	His Thr	Thr Ser	Lys Leu	Ser	
85	90	95						

gca tac gag	gat ctg	cag acc	ata aaa	tcg atg	ggg ttc	aga ggg	gag	456
Ala Tyr Glu	Asp Leu	Gln Thr	Ile Lys	Ser Met	Gly Phe	Arg Gly	Glu	
100	105	110						

gct ttg gct agt atg act tat gtt ggc cat gtt acc gtc aca acg ata
 Ala Leu Ala Ser Met Thr Tyr Val Gly His Val Thr Val Thr Ile
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 aca gaa ggc caa ttg cac ggc tac agg gtt tct tac aga gat ggt gta
 Thr Glu Gly Gln Leu His Gly Tyr Arg Val Ser Tyr Arg Asp Gly Val
 130 135 140 552

 atg gag aat gag cct aag cct tgc gct gcg gtg aaa gga act caa gtc
 Met Glu Asn Glu Pro Lys Pro Cys Ala Ala Val Lys Gly Thr Gln Val
 145 150 155 160 600

 atg gtt gaa aat cta ttt tac aac atg gta gcc cgc aag aaa aca ttg
 Met Val Glu Asn Leu Phe Tyr Asn Met Val Ala Arg Lys Lys Thr Leu
 165 170 175 648

 cag aac tcc aat gat gac tac ccc aag atc gta gac ttc atc agt cgg
 Gln Asn Ser Asn Asp Asp Tyr Pro Lys Ile Val Asp Phe Ile Ser Arg
 180 185 190 696

 ttt gca gtc cat cac atc aac gtt acc ttc tct tgc aga aag cat gga
 Phe Ala Val His His Ile Asn Val Thr Phe Ser Cys Arg Lys His Gly
 195 200 205 744

 gcc aat aga gca gat gtt cat agt gca agt aca tcc tca agg tta gat
 Ala Asn Arg Ala Asp Val His Ser Ala Ser Thr Ser Arg Leu Asp
 210 215 220 792

 gct atc agg agt gtc tat ggg gct tct gtc gtt cgt gat ctc ata gaa
 Ala Ile Arg Ser Val Tyr Gly Ala Ser Val Val Arg Asp Leu Ile Glu
 225 230 235 240 840

 ata aag gtt tca tat gag gat gct gca gat tca atc ttc aag atg gat
 Ile Lys Val Ser Tyr Glu Asp Ala Ala Asp Ser Ile Phe Lys Met Asp
 245 250 255 888

 ggt tac atc tca aat gca aat tat gtg gca aag aag att aca atg att
 Gly Tyr Ile Ser Asn Ala Asn Tyr Val Ala Lys Lys Ile Thr Met Ile
 260 265 270 936

 ctt ttc ata aat gat agg ctt gta gac tgt act gct ttg aaa aga got
 Leu Phe Ile Asn Asp Arg Leu Val Asp Cys Thr Ala Leu Lys Arg Ala
 275 280 285 984

 att gaa ttt gtg tac tct gca aca ttg cct caa gca tcc aaa cct ttc
 Ile Glu Phe Val Tyr Ser Ala Thr Leu Pro Gln Ala Ser Lys Pro Phe
 290 295 300 1032

 ata tac atg tcc ata cat ctt cca tca gaa cac gtg gat gtt aat ata
 Ile Tyr Met Ser Ile His Leu Pro Ser Glu His Val Asp Val Asn Ile
 305 310 315 320 1080

 cac cca acc aag aaa gag gtt agc ctt ttg aat caa gag cgt att att
 His Pro Thr Lys Lys Glu Val Ser Leu Leu Asn Gln Glu Arg Ile Ile
 325 330 335 1128

gaa aca ata aga aat gct att gag gaa aaa ctg atg aat tct aat aca Glu Thr Ile Arg Asn Ala Ile Glu Glu Lys Leu Met Asn Ser Asn Thr	340	345	350	1176
acc agg ata ttc caa act cag gca tta aac tta tca ggg att gct caa Thr Arg Ile Phe Gln Thr Gln Ala Leu Asn Leu Ser Gly Ile Ala Gln	355	360	365	1224
gct aac cca caa aag gat aag gtt tct gag gcc agt atg ggt tct gga Ala Asn Pro Gln Lys Asp Lys Val Ser Glu Ala Ser Met Gly Ser Gly	370	375	380	1272
aca aaa tct caa aaa att cct gtg agc caa atg gtc aga aca gat cca Thr Lys Ser Gln Lys Ile Pro Val Ser Gln Met Val Arg Thr Asp Pro	385	390	395	400
cgc aat cca tct gga aga ttg cac acc tac tgg cac ggg caa tct tca Arg Asn Pro Ser Gly Arg Leu His Thr Tyr Trp His Gly Gln Ser Ser	405	410	415	1368
aat ctt gaa aag aaa ttt gat ctt gta tct gta aga aat gtt gta aga Asn Leu Glu Lys Phe Asp Leu Val Ser Val Arg Asn Val Val Arg	420	425	430	1416
tca agg aga aac caa aaa gat gct ggt gat ttg tca agc cgt cat gag Ser Arg Arg Asn Gln Lys Asp Ala Gly Asp Leu Ser Ser Arg His Glu	435	440	445	1464
ctc ctt gtg gaa ata gat tct agc ttc cat cct ggc ctt ttg gac att Leu Leu Val Glu Ile Asp Ser Ser Phe His Pro Gly Leu Leu Asp Ile	450	455	460	1512
gtc aag aac tgc aca tat gtt gga ctt gcc gat gaa gcc ttt gct ttg Val Lys Asn Cys Thr Tyr Val Gly Leu Ala Asp Glu Ala Phe Ala Leu	465	470	475	480
ata caa cac aat acc cgc tta tac ctt gta aat gtg gta aat att agt Ile Gln His Asn Thr Arg Leu Tyr Leu Val Asn Val Val Asn Ile Ser	485	490	495	1608
aaa gaa ctt atg tac cag caa gct ttg tgc cgt ttt ggg aac ttc aat Lys Glu Leu Met Tyr Gln Gln Ala Leu Cys Arg Phe Gly Asn Phe Asn	500	505	510	1656
gct att cag ctc agt gaa cca gct cca ctt cag gag ttg ctg gtg atg Ala Ile Gln Leu Ser Glu Pro Ala Pro Leu Gln Glu Leu Leu Val Met	515	520	525	1704
gca ctg aaa gac gat gaa ttg atg agt gat gaa aag gat gat gag aaa Ala Leu Lys Asp Asp Glu Leu Met Ser Asp Glu Lys Asp Asp Glu Lys	530	535	540	1752
ctg gag att gca gaa gta aac act gag ata cta aaa gaa aat gct gag Leu Glu Ile Ala Glu Val Asn Thr Glu Ile Leu Lys Glu Asn Ala Glu	545	550	555	560

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aca aga ctt cct gtt gta ctg gac cag tac acc cct gat atg gac cgt Thr Arg Leu Pro Val Val Leu Asp Gln Tyr Thr Pro Asp Met Asp Arg 580 585 590	1896
ctt cca gaa ttt gtg ttg gct tta gga aat gat gtt act tgg gat gac Leu Pro Glu Phe Val Leu Ala Leu Gly Asn Asp Val Thr Trp Asp Asp 595 600 605	1944
gag aaa gag tgc ttc aga aca gta gct tct gct gta gga aac ttc tat Glu Lys Glu Cys Phe Arg Thr Val Ala Ser Ala Val Gly Asn Phe Tyr 610 615 620	1992
gca ctt cat ccc cca atc ctt cca aat cca tct ggg aat ggc att cat Ala Leu His Pro Pro Ile Leu Pro Asn Pro Ser Gly Asn Gly Ile His 625 630 635 640	2040
tta tac aag aaa aat aga gat tca atg gct gat gaa cat gct gag aat Leu Tyr Lys Lys Asn Arg Asp Ser Met Ala Asp Glu His Ala Glu Asn 645 650 655	2088
gat cta ata tca gat gaa aat gac gtt gat caa gaa ctt ctt gcg gaa Asp Leu Ile Ser Asp Glu Asn Asp Val Asp Gln Glu Leu Leu Ala Glu 660 665 670	2136
gca gaa gca gca tgg gcc caa cgt gag tgg acc att cag cat gtc ttg Ala Glu Ala Ala Trp Ala Gln Arg Glu Trp Thr Ile Gln His Val Leu 675 680 685	2184
ttt cca tcc atg cga ctt ttc ctc aag ccc ccg aag tca atg gca aca Phe Pro Ser Met Arg Leu Phe Leu Lys Pro Pro Lys Ser Met Ala Thr 690 695 700	2232
gat gga acg ttt gtg cag gtt gct tcc ttg gag aaa ctc tac aag att Asp Gly Thr Phe Val Gln Val Ala Ser Leu Glu Lys Leu Tyr Lys Ile 705 710 715 720	2280
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Ser Leu Asp Ala Gly Ala Ser Ser Val Ser Val Ala Val Lys Asp Gly		
50	55	60
Gly Leu Lys Leu Ile Gln Val Ser Asp Asp Gly His Gly Ile Arg Phe		
65	70	75
Glu Asp Leu Ala Ile Leu Cys Glu Arg His Thr Thr Ser Lys Leu Ser		
85	90	95
Ala Tyr Glu Asp Leu Gln Thr Ile Lys Ser Met Gly Phe Arg Gly Glu		
100	105	110
Ala Leu Ala Ser Met Thr Tyr Val Gly His Val Thr Val Thr Thr Ile		
115	120	125
Thr Glu Gly Gln Leu His Gly Tyr Arg Val Ser Tyr Arg Asp Gly Val		
130	135	140
Met Glu Asn Glu Pro Lys Pro Cys Ala Ala Val Lys Gly Thr Gln Val		
145	150	155
Met Val Glu Asn Leu Phe Tyr Asn Met Val Ala Arg Lys Lys Thr Leu		
165	170	175
Gln Asn Ser Asn Asp Asp Tyr Pro Lys Ile Val Asp Phe Ile Ser Arg		
180	185	190
Phe Ala Val His His Ile Asn Val Thr Phe Ser Cys Arg Lys His Gly		
195	200	205
Ala Asn Arg Ala Asp Val His Ser Ala Ser Thr Ser Arg Leu Asp		
210	215	220
Ala Ile Arg Ser Val Tyr Gly Ala Ser Val Val Arg Asp Leu Ile Glu		
225	230	235
Ile Lys Val Ser Tyr Glu Asp Ala Ala Asp Ser Ile Phe Lys Met Asp		
245	250	255
Gly Tyr Ile Ser Asn Ala Asn Tyr Val Ala Lys Lys Ile Thr Met Ile		
260	265	270
Leu Phe Ile Asn Asp Arg Leu Val Asp Cys Thr Ala Leu Lys Arg Ala		
275	280	285
Ile Glu Phe Val Tyr Ser Ala Thr Leu Pro Gln Ala Ser Lys Pro Phe		
290	295	300
Ile Tyr Met Ser Ile His Leu Pro Ser Glu His Val Asp Val Asn Ile		
305	310	315
His Pro Thr Lys Lys Glu Val Ser Leu Leu Asn Gln Glu Arg Ile Ile		
325	330	335
Glu Thr Ile Arg Asn Ala Ile Glu Glu Lys Leu Met Asn Ser Asn Thr		
340	345	350
Thr Arg Ile Phe Gln Thr Gln Ala Leu Asn Leu Ser Gly Ile Ala Gln		
355	360	365
Ala Asn Pro Gln Lys Asp Lys Val Ser Glu Ala Ser Met Gly Ser Gly		
370	375	380
Thr Lys Ser Gln Lys Ile Pro Val Ser Gln Met Val Arg Thr Asp Pro		
385	390	395
Arg Asn Pro Ser Gly Arg Leu His Thr Tyr Trp His Gly Gln Ser Ser		
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Asn Leu Glu Lys Lys Phe Asp Leu Val Ser Val Arg Asn Val Val Arg		
420	425	430
Ser Arg Arg Asn Gln Lys Asp Ala Gly Asp Leu Ser Ser Arg His Glu		
435	440	445
Leu Leu Val Glu Ile Asp Ser Ser Phe His Pro Gly Leu Leu Asp Ile		
450	455	460
Val Lys Asn Cys Thr Tyr Val Gly Leu Ala Asp Glu Ala Phe Ala Leu		
465	470	475
		480

Ile Gln His Asn Thr Arg Leu Tyr Leu Val Asn Val Val Asn Ile Ser
 485 490 495
 Lys Glu Leu Met Tyr Gln Gln Ala Leu Cys Arg Phe Gly Asn Phe Asn
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 515 520 525
 Ala Leu Lys Asp Asp Glu Leu Met Ser Asp Glu Lys Asp Asp Glu Lys
 530 535 540
 Leu Glu Ile Ala Glu Val Asn Thr Glu Ile Leu Lys Glu Asn Ala Glu
 545 550 555 560
 Met Ile Asn Glu Tyr Phe Ser Ile His Ile Asp Gln Asp Gly Lys Leu
 565 570 575
 Thr Arg Leu Pro Val Val Leu Asp Gln Tyr Thr Pro Asp Met Asp Arg
 580 585 590
 Leu Pro Glu Phe Val Leu Ala Leu Gly Asn Asp Val Thr Trp Asp Asp
 595 600 605
 Glu Lys Glu Cys Phe Arg Thr Val Ala Ser Ala Val Gly Asn Phe Tyr
 610 615 620
 Ala Leu His Pro Pro Ile Leu Pro Asn Pro Ser Gly Asn Gly Ile His
 625 630 635 640
 Leu Tyr Lys Lys Asn Arg Asp Ser Met Ala Asp Glu His Ala Glu Asn
 645 650 655
 Asp Leu Ile Ser Asp Glu Asn Asp Val Asp Gln Glu Leu Leu Ala Glu
 660 665 670
 Ala Glu Ala Ala Trp Ala Gln Arg Glu Trp Thr Ile Gln His Val Leu
 675 680 685
 Phe Pro Ser Met Arg Leu Phe Leu Lys Pro Pro Lys Ser Met Ala Thr
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 Ser Pro Ala Thr Thr Ile Val Pro Arg Glu Pro Pro Lys Ile Gln Arg
 20 25 30

tta gaa gaa tca gta gtc aac cgt atc gca gct ggt gaa gta atc cag 143
 Leu Glu Glu Ser Val Val Asn Arg Ile Ala Ala Gly Glu Val Ile Gln
 35 40 45

cgt cca gtt tca gct gtg aaa gag ctc gtt gag aac agc ctc gac gcc			191
Arg Pro Val Ser Ala Val Lys Glu Leu Val Glu Asn Ser Leu Asp Ala			
50	55	60	
gat tca agt tcc ata agc gtc gtt gtc aaa gac ggt ggt ttg aaa ctc			239
Asp Ser Ser Ser Ile Ser Val Val Val Lys Asp Gly Gly Leu Lys Leu			
65	70	75	
att caa gtc tcc gac gac ggt cac ggt att aga cgt gaa gac ttg ccg			287
Ile Gln Val Ser Asp Asp Gly His Gly Ile Arg Arg Glu Asp Leu Pro			
80	85	90	95
ata cta tgc gag aga cat aca aca tcg aag ctg act aag ttt gag gat			335
Ile Leu Cys Glu Arg His Thr Thr Ser Lys Leu Thr Lys Phe Glu Asp			
100	105	110	
ttg ttc tct ctg agt tca atg gga ttt aga gga gag gca tta gct agt			383
Leu Phe Ser Leu Ser Ser Met Gly Phe Arg Gly Glu Ala Leu Ala Ser			
115	120	125	
atg acc tat gtt gct cat gtt aca gtg act act att act aaa ggc cag			431
Met Thr Tyr Val Ala His Val Thr Val Thr Ile Thr Lys Gly Gln			
130	135	140	
att cat ggt tat aga gtg tct tat aga gat ggt gtc atg gag cat gaa			479
Ile His Gly Tyr Arg Val Ser Tyr Arg Asp Gly Val Met Glu His Glu			
145	150	155	
cca aag gcg tgt gct gtc aaa gga aca cag ata atg gtg gag aat			527
Pro Lys Ala Cys Ala Ala Val Lys Gly Thr Gln Ile Met Val Glu Asn			
160	165	170	175
ttg ttc tac aat atg att gct aga agg aag aca cttcaa aat tct gct			575
Leu Phe Tyr Asn Met Ile Ala Arg Arg Lys Thr Leu Gln Asn Ser Ala			
180	185	190	
gat gat tac ggg aaa atc gtg gat ttg ctg agc cgg atg gct att cat			623
Asp Asp Tyr Gly Lys Ile Val Asp Leu Leu Ser Arg Met Ala Ile His			
195	200	205	
tac aat aat gtc agc ttt tct tgt cga aag cat gga gct gtt aag gct			671
Tyr Asn Asn Val Ser Phe Ser Cys Arg Lys His Gly Ala Val Lys Ala			
210	215	220	
gat gtt cac tca gtc gtg tca cct tca agg ctt gat tca att agg tct			719
Asp Val His Ser Val Val Ser Pro Ser Arg Leu Asp Ser Ile Arg Ser			
225	230	235	
gta tat gga gta tca gtt gca aag aac ttg atg aaa gta gaa gtt tcc			767
Val Tyr Gly Val Ser Val Ala Lys Asn Leu Met Lys Val Glu Val Ser			
240	245	250	255
tcc tgt gac tcc tct ggt tgt act ttt gat atg gag ggt ttc ata tcc			815
Ser Cys Asp Ser Ser Gly Cys Thr Phe Asp Met Glu Gly Phe Ile Ser			
260	265	270	

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gat aga ttg gtg gaa tgc tct gcc tta aaa aga gcc att gaa att gtt Asp Arg Leu Val Glu Cys Ser Ala Leu Lys Arg Ala Ile Glu Ile Val	290	295	300	911
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atc aat ttg cca cg ^g gaa cat gtt gat atc aat att cac cca aca aag Ile Asn Leu Pro Arg Glu His Val Asp Ile Asn Ile His Pro Thr Lys	320	325	330	1007
aaa gag gtt agc ctt cta aac cag gaa atc att att gag atg ata cag Lys Glu Val Ser Leu Leu Asn Gln Glu Ile Ile Glu Met Ile Gln	340	345	350	1055
tca gag gtt gaa gta aaa ctg aga aac gca aat gat act agg acg ttt Ser Glu Val Glu Val Lys Leu Arg Asn Ala Asn Asp Thr Arg Thr Phe	355	360	365	1103
caa gag cag aaa gtg gaa tac att caa tct acg tta aca tct cag aaa Gln Glu Gln Lys Val Glu Tyr Ile Gln Ser Thr Leu Thr Ser Gln Lys	370	375	380	1151
agt gat tct cca gtt tct cag aag cct tct gga caa aag aca cag aaa Ser Asp Ser Pro Val Ser Gln Lys Pro Ser Gly Gln Lys Thr Gln Lys	385	390	395	1199
gtt cct gtg aac aaa atg gtg aga aca gat tca tca gat cca gct gga Val Pro Val Asn Lys Met Val Arg Thr Asp Ser Ser Asp Pro Ala Gly	400	405	410	415
agg tta cat gcc ttt ttg caa ccc aag cca caa agt ctc cct gac aag Arg Leu His Ala Phe Leu Gln Pro Lys Pro Gln Ser Leu Pro Asp Lys	420	425	430	1295
gtt tct agt ttg agt gta gta agg tct tct gta agg caa aga aga aac Val Ser Ser Leu Ser Val Val Arg Ser Ser Val Arg Gln Arg Arg Asn	435	440	445	1343
cca aag gaa act gct gat ctt tct agt gtc cag gaa ctt att gct gga Pro Lys Glu Thr Ala Asp Leu Ser Ser Val Gln Glu Leu Ile Ala Gly	450	455	460	1391
gtt gac agc tgc tgc cat cca ggt atg ctg gag act gta agg aat tgc Val Asp Ser Cys Cys His Pro Gly Met Leu Glu Thr Val Arg Asn Cys	465	470	475	1439
aca tat gtt gga atg gca gat gat gtt ttt gct tta gtt cag tat aac Thr Tyr Val Gly Met Ala Asp Asp Val Phe Ala Leu Val Gln Tyr Asn	480	485	490	495

acc cat cta tat cta gca aat gtg gtg aat ctc agc aaa gag cta atg		1535
Thr His Leu Tyr Leu Ala Asn Val Val Asn Leu Ser Lys Glu Leu Met		
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tat cag caa act ctt cgt cgt ttt gct cat ttt aac gca ata cag ctt		1583
Tyr Gln Gln Thr Leu Arg Arg Phe Ala His Phe Asn Ala Ile Gln Leu		
515	520	525
agc gat cca gcc cct ttg tca gag ttg ata ttg ttg gct ctg aaa gag		1631
Ser Asp Pro Ala Pro Leu Ser Glu Leu Ile Leu Ala Leu Lys Glu		
530	535	540
gag gat cta gat cca gga aat gat aca aaa gat gat ctg aaa gaa aga		1679
Glu Asp Leu Asp Pro Gly Asn Asp Thr Lys Asp Asp Leu Lys Glu Arg		
545	550	555
att gct gaa atg aat aca gaa ctc ctc aag gaa aaa gca gaa atg tta		1727
Ile Ala Glu Met Asn Thr Glu Leu Leu Lys Glu Lys Ala Glu Met Leu		
560	565	570
575		
gag gag tat ttc agc gtg cac att gac tcc agt gca aat ttg tca agg		1775
Glu Glu Tyr Phe Ser Val His Ile Asp Ser Ser Ala Asn Leu Ser Arg		
580	585	590
ctt cct gtg ata ctc gac cag tat aca cct gac atg gat cgt gtt cct		1823
Leu Pro Val Ile Leu Asp Gln Tyr Thr Pro Asp Met Asp Arg Val Pro		
595	600	605
gaa ttt tta cta tgc ttg gga aat gat gtt gag tgg gaa gat gag aag		1871
Glu Phe Leu Leu Cys Leu Gly Asn Asp Val Glu Trp Glu Asp Glu Lys		
610	615	620
agt tgc ttt caa gga gtt tct gca gct att ggg aac ttt tac gcc atg		1919
Ser Cys Phe Gln Gly Val Ser Ala Ala Ile Gly Asn Phe Tyr Ala Met		
625	630	635
cat cct cct ctt ttg cca aac cca tcg ggt gac ggt att cag ttc tat		1967
His Pro Pro Leu Leu Pro Asn Pro Ser Gly Asp Gly Ile Gln Phe Tyr		
640	645	650
655		
agt aag aga ggt gag agc tct cag gaa aag tca gat tta gag ggt aac		2015
Ser Lys Arg Gly Glu Ser Ser Gln Glu Lys Ser Asp Leu Glu Gly Asn		
660	665	670
gtc gat atg gag gac aat ctt gac caa gat ctt ctg tca gat gct gaa		2063
Val Asp Met Glu Asp Asn Leu Asp Gln Asp Leu Leu Ser Asp Ala Glu		
675	680	685
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Asn Ala Trp Ala Gln Arg Glu Trp Ser Ile Gln His Val Leu Phe Pro		
690	695	700
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Ser Met Arg Leu Phe Leu Lys Pro Pro Ala Ser Met Ala Ser Asn Gly		
705	710	715

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 35 40 45
 Pro Val Ser Ala Val Lys Glu Leu Val Glu Asn Ser Leu Asp Ala Asp
 50 55 60
 Ser Ser Ser Ile Ser Val Val Lys Asp Gly Gly Leu Lys Leu Ile
 65 70 75 80
 Gln Val Ser Asp Asp Gly His Gly Ile Arg Arg Glu Asp Leu Pro Ile
 85 90 95
 Leu Cys Glu Arg His Thr Thr Ser Lys Leu Thr Lys Phe Glu Asp Leu
 100 105 110
 Phe Ser Leu Ser Ser Met Gly Phe Arg Gly Glu Ala Leu Ala Ser Met
 115 120 125
 Thr Tyr Val Ala His Val Thr Val Thr Ile Thr Lys Gly Gln Ile
 130 135 140
 His Gly Tyr Arg Val Ser Tyr Arg Asp Gly Val Met Glu His Glu Pro
 145 150 155 160
 Lys Ala Cys Ala Ala Val Lys Gly Thr Gln Ile Met Val Glu Asn Leu
 165 170 175
 Phe Tyr Asn Met Ile Ala Arg Arg Lys Thr Leu Gln Asn Ser Ala Asp
 180 185 190
 Asp Tyr Gly Lys Ile Val Asp Leu Leu Ser Arg Met Ala Ile His Tyr
 195 200 205
 Asn Asn Val Ser Phe Ser Cys Arg Lys His Gly Ala Val Lys Ala Asp
 210 215 220
 Val His Ser Val Val Ser Pro Ser Arg Leu Asp Ser Ile Arg Ser Val
 225 230 235 240
 Tyr Gly Val Ser Val Ala Lys Asn Leu Met Lys Val Glu Val Ser Ser
 245 250 255
 Cys Asp Ser Ser Gly Cys Thr Phe Asp Met Glu Gly Phe Ile Ser Asn
 260 265 270
 Ser Asn Tyr Val Ala Lys Lys Thr Ile Leu Val Leu Phe Ile Asn Asp
 275 280 285
 Arg Leu Val Glu Cys Ser Ala Leu Lys Arg Ala Ile Glu Ile Val Tyr
 290 295 300
 Ala Ala Thr Leu Pro Lys Ala Ser Lys Pro Phe Val Tyr Met Ser Ile
 305 310 315 320

Asn Leu Pro Arg Glu His Val Asp Ile Asn Ile His Pro Thr Lys Lys
325 330 335
Glu Val Ser Leu Leu Asn Gln Glu Ile Ile Ile Glu Met Ile Gln Ser
340 345 350
Glu Val Glu Val Lys Leu Arg Asn Ala Asn Asp Thr Arg Thr Phe Gln
355 360 365
Glu Gln Lys Val Glu Tyr Ile Gln Ser Thr Leu Thr Ser Gln Lys Ser
370 375 380
Asp Ser Pro Val Ser Gln Lys Pro Ser Gly Gln Lys Thr Gln Lys Val
385 390 395 400
Pro Val Asn Lys Met Val Arg Thr Asp Ser Ser Asp Pro Ala Gly Arg
405 410 415
Leu His Ala Phe Leu Gln Pro Lys Pro Gln Ser Leu Pro Asp Lys Val
420 425 430
Ser Ser Leu Ser Val Val Arg Ser Ser Val Arg Gln Arg Arg Asn Pro
435 440 445
Lys Glu Thr Ala Asp Leu Ser Ser Val Gln Glu Leu Ile Ala Gly Val
450 455 460
Asp Ser Cys Cys His Pro Gly Met Leu Glu Thr Val Arg Asn Cys Thr
465 470 475 480
Tyr Val Gly Met Ala Asp Asp Val Phe Ala Leu Val Gln Tyr Asn Thr
485 490 495
His Leu Tyr Leu Ala Asn Val Val Asn Leu Ser Lys Glu Leu Met Tyr
500 505 510
Gln Gln Thr Leu Arg Arg Phe Ala His Phe Asn Ala Ile Gln Leu Ser
515 520 525
Asp Pro Ala Pro Leu Ser Glu Leu Ile Leu Ala Leu Lys Glu Glu
530 535 540
Asp Leu Asp Pro Gly Asn Asp Thr Lys Asp Asp Leu Lys Glu Arg Ile
545 550 555 560
Ala Glu Met Asn Thr Glu Leu Leu Lys Glu Lys Ala Glu Met Leu Glu
565 570 575
Glu Tyr Phe Ser Val His Ile Asp Ser Ser Ala Asn Leu Ser Arg Leu
580 585 590
Pro Val Ile Leu Asp Gln Tyr Thr Pro Asp Met Asp Arg Val Pro Glu
595 600 605
Phe Leu Leu Cys Leu Gly Asn Asp Val Glu Trp Glu Asp Glu Lys Ser
610 615 620
Cys Phe Gln Gly Val Ser Ala Ala Ile Gly Asn Phe Tyr Ala Met His
625 630 635 640
Pro Pro Leu Leu Pro Asn Pro Ser Gly Asp Gly Ile Gln Phe Tyr Ser
645 650 655
Lys Arg Gly Glu Ser Ser Gln Glu Lys Ser Asp Leu Glu Gly Asn Val
660 665 670
Asp Met Glu Asp Asn Leu Asp Gln Asp Leu Leu Ser Asp Ala Glu Asn
675 680 685
Ala Trp Ala Gln Arg Glu Trp Ser Ile Gln His Val Leu Phe Pro Ser
690 695 700
Met Arg Leu Phe Leu Lys Pro Pro Ala Ser Met Ala Ser Asn Gly Thr
705 710 715 720
Phe Val Lys Val Ala Ser Leu Glu Lys Leu Tyr Lys Ile Phe Glu Arg
725 730 735
Cys